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Beer: Necessity or Luxury?

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A Special Topic Issue:

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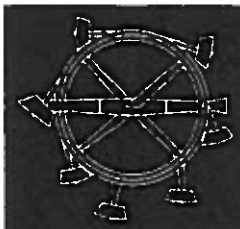

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Beer: Necessity or luxury?[1]

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It is well known that in medieval Europe beer was a vital part of household production, a standard table beverage, and a basic element of the diet. The universal appeal of beer has been commonly explained in much of the English-language scholarship for nearly the last forty years as due to concerns about water pollution. Thus, as H.S. Corran (1975, 35) explained:

> water supplies were unreliable from the point of view of health ... the processes of brewing – heating before mashing, and better still boiling to incorporate the aromatic principles of hops, followed by fermentation of the sugar to alcohol – produced a liquor that was not only quite sterile in itself ... but also resisted any attempts to infect it with hostile bacteria.

Since then the poor quality of drinking water in the Middle Ages (or more generally in pre-modern times) as well as the necessity of beer (and wine) as substitutes for water have been assumed in numerous scholarly and popular works (Saul 1983, 78; more cautiously 2005, 69; Austin *et al.* 1985, xvi; Pounds 1994, 201; Scully 1995, 138; Bennett 1996, 8–9, 16–17; Humphrey, Oleson; Sherwood 1998, 163; Martin 2001, 120; Goldberg 2004, 95, 286; Smyth 2004, xvi; Unger 2004, xiii, 3; Denny 2009, 16; Perozzi and Beaune 2009, 40; Beer 2010, 84; Solomon 2010, 253; Johnston 2011, 64; Oliver 2012, 1). Some writers have more cautiously posited this situation only in certain problem regions, such as over-populated urban areas (Wilson 2003, 158; McBride 2004, 182; Forgeng and McLean 2009, 191). In any case, beer is seen as no mere thirst-quencher but a necessity in the Middle Ages (Wilson 2003, 158; Unger 2004, xiii). The present *communis opinio* is perhaps best summarized in the *Larousse Encyclopedia of Wine* (Foulkes 2001, 24):

> For medieval man, wine or beer was not a luxury but a necessity. Cities had impure – often dangerous – water supplies. Wine was an antiseptic, a component of the primitive medicine of the time. It was added to water to alleviate its endemic pollution. Water was rarely drunk by itself, in cities at least. "Water is not wholesome sole by itself, for an Englishman," wrote Andrew Boorde, an English scholar, in 1542.

Certainly Andrew Boorde is a late source with which to support an argument for the whole medieval period, and one should hardly believe that he represents the general opinion for all people at all places throughout the Middle Ages. Furthermore, although Boorde certainly felt that (unhopped) ale "for an englysshe man is a naturall drynke," and not water, because of its healthfulness (1542, ch. X, s.vv. ale and beer), Boorde in point of fact did not reject water because of its impurity. While it may certainly be true that those who drank beer or wine or other alcoholic beverages had less of a risk of catching certain diseases present in water (Lucia 1963, 164, Hagen 2006, 203; Cool 2006, 129), it is much different to argue that people generally avoided water because of this. Indeed, as Paolo Squatriti especially has shown, water was not particularly polluted during the Middle Ages (1998, 41) and, though not popular or highly appreciated, it was drunk (36–39). Furthermore, when it was avoided it was not because of its general impurity but because, since antiquity, among the elite at least, it had been considered a lowly beverage (41–42); therefore other drinks were consumed precisely as luxuries and not as necessities.[2]

Water

Already in antiquity there was a general, and in fact commonsensical, realization that there are both pure and impure waters. However, differences in opinion arose in regard to two essential questions: first, which are the purest types of water (that is, their "hierarchy," as Squatriti 1998, 37 puts it); and, second, how can impure waters be made safe to drink (that is, their purification).

In the Hippocratic work on airs, waters, and places (probably written in the late fifth century BCE), a hierarchy of waters is provided with rain-water then spring-water among the best and snow-, ice-, and marsh-water among the worst (*Aer.* 7–8, quoted in part in Paul Aeg., *Epit. med.* 1.50; Orib., *Syn.* 4.41.7). In the first century the encyclopedist Aulus Cornelius Celsus listed the following waters as best to worst (2.18.12): rain-water, spring-water, river-water, well-water, snow- or ice-water, lake-water, and marsh-water. Around the same time the physician Rufus of Ephesus listed in order rain-water, spring-water, well-water, river-water, and lake-water, though he provided some exceptions (fr. 66 Daremberg-Ruelle in Aët. Amid., *Lib. med.* 3.165; fr. 11 in Orib., *Coll. med.* 5.3; fr. 411 in Rhazes, *Cont.* 37.1).[3]

Medieval authors had their own hierarchies. Thus, for instance, Avicenna (eleventh century) thought best rain-water then snow- or ice-water while Hildegard von Bingen (twelfth century) placed well-water first and spring-water second, Bartholomew of England (thirteenth century) had rain-water first and well-water second, and Pier de' Crescenzi (late thirteenth or early fourteenth century) considered best spring-water and running-water.[4] Most authorities then agreed that rain-water was the purest in nature, which indeed is the case

(Clegg and Clegg 1973, 131). Otherwise, the difference in responses betrays both the lack of accurate knowledge about the cause of impurity in water as well as the means of detecting it, which were often little more sophisticated than examining water by sight and smell (and sometimes even taste). This would obviously explain why marsh- or swamp-water was usually considered among the worst. On the other hand, snow- and ice-water were probably reckoned poor because they were cold, heat being thought to purify water.

However, there was a greater degree of sophistication with regard to the issue of purification. Indeed, in general the treatment of all drinking water was recommended, and already among the Greeks it was realized that boiling water could remove impurities in it. As is known today, boiling is the "simplest and most effective way to kill all disease-causing pathogens" in water (World Health Organization 2011, 108). The first explicit mention of boiling water for purification seems to be in the same Hippocratic work on airs, waters, and places already cited, where it is said that though rain-water is the best type of water for drinking, it still needs to be boiled before being drunk (*Aer.* 8).[5] The historian Herodotus had already spoken of the sixth-century BCE Persian King Cyrus drinking only water from the Choaspes river which had been boiled, and in the fourth century BCE Ctesias of Cnidus said that this boiled water was very light and pleasant.[6] Presumably in these instances it was boiled for health reasons (Forbes 1964, 178, Baker and Taras 1981, 4; Briant 1994, 57–58). In the fourth century BCE, Theophrastus stated that waters which are heavy, harsh, cold, and full of sediment are inferior since they take longer to boil whereas water that can be warmed quickly is light and healthy (fr. 214a Fortenbaugh in Athen., *Deipn.* 2.42b–c). Around the same time Diocles of Carystus recommended reducing water by one-third in boiling to purify it (fr. 236 van der Eijk in Orib., *Coll. med.* 5.4). The first-century author Pliny the Elder noted of water that "it is agreed that certainly all is more beneficial boiled" and also "it is a treatment for impure water if it is boiled down to one half" (*Hist. nat.* 31.23.40 [*omnem utique decoctam utiliorem esse convenit ... vitiosae aquae remedium est, si decoquatur ad dimidias partes*]). In the third century, Florentinus suggested rather that boiling down to nine-tenths was sufficient for safe drinking water (*Geopon.* 2.47.11). Oribasius also recommended boiling impure water but did not provide any guidelines (*Coll. med.* 5.1.11). It is worth noting that now it is recommended that impure water be brought "to a rolling boil" and then "be allowed to cool without the addition of ice" (World Health Organization 2011, 108 and see 110, 143, 151).

It may be wondered, of course, how often water was in fact boiled before it was drunk, since it is a rather inconvenient step which costs fuel, time, and labor (Magnusson 2001, 135). Indeed, Rufus of Ephesus recommended that water be made more potable by boiling it in ceramic containers, allowing it to cool overnight, and then reheating it before drinking, a rather involved process (fr. 11 Daremberg-Ruelle in Orib., *Coll. med.* 5.3.36; fr. 66.17 in Aët. Amid., *Lib. med.* 3.165). In the following century, the physician Galen, on the other hand, recommended that suspicious water be boiled and placed in a sealed container in snow or else in a cold well or falls to cool it down (*Comm. IV Hipp. Epid.* 6.10, cited in Orib., *Coll. med.* 5.1.11–15), thus creating not only a pure but also a cold drink, unlike most beverages which were no doubt served at ambient temperature. In some sense then, boiled as well as cooled water could be considered a luxury, and it was in fact the profligate Emperor Nero in the first century who was said to have been the first to make a special drink (known as *decocta* or "boiled down") in which water was boiled and then cooled in ice.[7] However, that boiled drinking water was not just a part of the diet of the elite who possessed the knowledge, resources, and leisure to produce it but a more widespread product seems to be suggested in a passage by the third-century jurist Paul (as preserved in the sixth-century legal digest of Justinian); in discussing the terminology in wills, he speaks of "the bronze cauldron which hangs over the hearth" as a typical piece of equipment on farms (*fundi*), explaining that in it "water is boiled for drinking" (*Vitell.* 2 in Just., *Dig.* 33.7.18.3 [*aenum, quod supra focum pendet ... aqua ad potandum calefit*]).[8]

The knowledge of the importance of boiling water to purify it certainly existed in the Middle Ages.[9] It is found in Avicenna (*Can.* 10.8.1 [850 and 852]) but receives an especially lengthy treatment from Hildegard of Bingen. She explains that waters "are purified through any fire in boiling" (*Caus. et cur.* 1 in Kaiser 1903, 24 and Moulinier 2003, 48 [*per ignem aliquantum in coctione purgantur*]; see Kaiser 1903, 25–26 and Moulinier 2003, 49) and that natural waters that were not useful for drinking were those not heated by the sun (Kaiser 1903, 25 and Moulinier 2003, 49). Indeed Isidore of Seville had already noted that sea-waters become potable as rain after they have been taken up into clouds because "they are boiled by the fire of the sun" (*Nat. rer.* 33.2 [*coquuntur igne solis*]).[10] Hildegard went further in often advising that water should be boiled and then cooled before drinking (*Caus. et cur.* 1 in Kaiser 1903, 25, 27–28 and Moulinier 2003, 48, 49, 51; *Caus. et cur.* 2 in Kaiser 1903, 115 and Moulinier 2003, 155; *Caus. et cur.* 4 in Kaiser 1903, 187 and Moulinier 2003, 232),[11] so often and with such insistence that it may certainly be wondered again how widespread knowledge of boiling was. Later, Pier de' Crescenzi also mentioned the importance of boiling water as well as distilling it for purification,[12] and many other subsequent examples of such advice could also be cited.[13]

It is of course now known that boiling water sterilizes it by killing off microbes, and it has been pointed out that since the ancients "did not understand the nature of microbial contamination of fresh water" they simply "had found by experience that boiled water was safer" (Dalby 2003, 346; see Prioreschi 1998, 637). Certainly many explained the impurity of a certain type of water as due to its source (as seen above) and ancient and medieval authorities on the whole are silent about why boiling purifies water. Remarkably, Hildegard did speak of water containing harmful "little creatures" (*Caus. et cur.* 1 in Kaiser 1903, 25 and Moulinier 2003, 49 [*parva anima-*

lia]) and she may have had some sense that these were killed off through heat.[14]

All this clearly shows that at least some ancient and medieval people had sophisticated notions about the purity of water and that boiled water was at least occasionally drunk.

Beer

Since boiling water was known to purify it, the conclusions of modern scholars who claim that beer was drunk instead of water because beer was sterilized through boiling may certainly be questioned.[15] Hildegard for one says that beer will not much harm someone with lung problems since "it has been boiled" (*Caus. et cur.* 3 in Kaiser 1903, 168 and Moulinier 2003, 210; *Phys.* 1.13 in *PL* 197.1134C [*cocta est*]), but one may justifiably wonder why one simply did not boil water, cool it down, and then drink it rather than go through the whole long process of brewing and fermentation for one's daily drink. Indeed, if it can be objected that simply boiling water to purify it was too much of an inconvenience to be practiced regularly, all the more could turning it into beer for the simple sake of purity.

Of course today it is also known that the process of fermentation further protects beer from contamination from pathogenic germs since alcohol is antiseptic (Hough 1985, 1; Dalby 2003, 350–351; Esslinger 2009, 525) and it is this property that scholars have often pointed to in order to explain the popularity of alcohol over water (Corran 1975, 35; Newman 2001, 17; Pounds 2005, 64; Schick 2007, 146).[16] But among ancient authorities, if on the one hand they knew that boiling could purify water, on the other hand some thought that fermentation could spoil it.[17] In the fourth century BCE Theophrastus knew that boiling water purified it (fr. 214a Fortenbaugh in Athen., *Deipn.* 2.42b–c) and also that water was boiled to make beer (*Hist. plant.* 4.8.12 [cited above]), but he nevertheless thought of beer as a spoiling of cereals (*De caus. plant.* 6.11.2), an idea found later in a number of other authors.[18] In the early third century the Christian philosopher Sextus Julius Africanus spoke of those who make alcoholic beverages not as unwilling to drink impure water (as one might be led to believe) but as "refusing a drink of pure water" (1.19.19–20 Vieillefond [*tēn katharou hudatos posin paraitoumenoi*]).[19] The same idea is found in the late fourth and early fifth century, where Jerome spoke of Egyptians drinking beer "since they do not allow pure water for drinking" (*Comm. Is.* 7.19.292 in *PL* 24.253A [*ut non puras aquas bibentibus tribuant*]); their beer, he says, was cloudy, an attribute of beer found in the works of other early Christian authors (Euseb., *Comm. Is.* 1.75 in *PG* 24.227A-B and Cyril, *Comm. Is.* 2.4.287–288 in *PG* 70.459CD).[20] Even as late as the late sixth century, Venantius Fortunatus could speak of brewing as spoiling pure water (*Append. carm.* 9.18), describing beer as murky (9.16). This emphasis on the appearance of beer demonstrates that these sources are not simply attacking the beverage from a Christian, moralistic perspective (as, for instance, a morally dangerous intoxicant), but because of its physical properties. Though the murkiness of beers may have contributed to the notion that beer was in general an impure beverage, some ancient and medieval beers were certainly filtered (see Nelson 2005a, 104, 115) and were even clear (88, 111). The notion that the clarity of beer was a concern only in fairly modern times, especially supposing that beer was not drunk from glassware, has little support.[21]

While the process of fermentation made some consider beer to be inferior to water, wine too was often considered a problematic beverage. In antiquity beer was distinguished from wine as a different sort of substance, there being no ancient Greek or Latin term or concept for "alcohol" (as opposed to "intoxicant," which could include various sorts of narcotics) (Nelson 2005a, 34–35). Although some believed that wine (like beer) was spoiled water, this time due to rotten grapes rather than rotten cereals, in general wine came to be conceived of as a fundamentally non-watery drink and one not produced through spoilage (that is, through the action of yeast).[22] Early in their history, Greeks normally mixed wine with water, in various proportions, at the time of drinking, and this tradition was later taken up by Romans and continued into the Middle Ages.[23] While this may have eventually been done to cut the alcohol content in keeping with an ideal of moderation, the original reason remains obscure, and there was in fact no consensus of opinion in antiquity to explain it.[24] Some believed that wine on its own was a dangerous drink which was made less dangerous by the addition of water. Plutarch, for instance, wrote in the first century: "The mixture of wine [with water] removes its [wine's] harmfulness without depriving it of its usefulness."[25] Similarly, somewhat later, Clement of Alexandria said that since wine was harmful it had to be mixed as much as possible with water (*Paed.* 2.23). Others went so far as to promote water-drinking and total abstention from wine.[26] Jumping ahead in time, according to Hildegard, because of the potential dangers of immoderate wine-drinking it is more healthful to drink water rather than wine to quench thirst (*Phys.* 1.182 in *PL* 197.1199B-C).[27] Others suggested that water was to be placed in wine to purify the water, as a substitute to boiling it.[28] However, to claim, as some scholars do (Forbes 1964, 178; Foulkes 2001, 24), that wine and water were regularly mixed together in order to purify the water rather than to temper the wine may be an overstatement, and just as dubious is the notion that ancient Greeks and Romans (or medieval Europeans) had a sophisticated understanding of the antiseptic property of wine.[29]

Though for the most part medieval sources do not seem to follow the ancient notion that beer was impure water[30] – nor for that matter, the idea that wine was purified with the addition of water – beer and wine were surely still sometimes considered unhealthful or at least improper because they were intoxicating beverages. Thus, for instance, the sixth-century St. Radegundis was said to avoid drinking "the purity of wine or the boiling-down[31] of mead and the cloudiness of

beer" (*Vit. Sanct. Rad.* 1.15 in *PL* 72.657A, 88.504A [*vini ... puritatem aut medi decoctionem cervisaeque turbidinem*]), presumably because of their intoxicating power. And at the Cistercian abbey of Wallia it was decreed by the year 1195 that "neither beer nor any other drink except plain water" should be drunk (*Stat. ord. Cisterc.* 76 in Canivez 1933, 193 [*nec cervisia nec aliquis potus praeter aquam simplicem bibatur*]), presumably at least in part to avoid intoxication and to resort to a beverage that was considered least suspicious.[32] It was also known that beer was susceptible to impurity during its production; thus Charlemagne admonished that beer among other products made by hand should be produced with great care with respect to cleanliness (*Capit. de vill.* 34).[33] Even once brewed and fermented, beer (just like water) can obviously become contaminated,[34] and it is clear that there was an awareness of this as well, at least among some medieval authors. Thus it was considered necessary not only to warn about not drinking beer in which one has found a mouse but to make this an offense requiring penance (Anon., *De remed. pecc.* [= Ps.-Egb. in *PL* 89.447B-C and Ps.-Bede in *PL* 94.571B]).[35] This admonition would tend to indicate that there was not a general appreciation for the potential hazards of contaminated beer, but at least by the end of the thirteenth century in England professional inspectors had the task to ensure not only that beer sold to the public was done so according to officially-sanctioned prices and measures but also was of good quality.[36] Inspectors determined the quality of the beer at least in part from the good flavor and clear appearance of the product.[37] No doubt most beers, which would have been made simply from malted cereals, water, and yeast and left unfiltered, would have been cloudy and occasionally a bit sweet but predominately tart,[38] and presumably only if there was an excessive turbidity or pronounced sourness would they have been considered undrinkable. Thus, for instance, in the late eighth century Alcuin complained of having drunk sour beer which hurt his stomach when he had no wine on hand (*Epist.* 5 Chase), and it was reported that Franciscan brothers in London in 1224 were so poor that they only had very sour ale to drink and therefore preferred to drink water (*Epist. fratr. Adae de Marisco de ord. min.* in Brewer 1858, 8; cited in Salzman 1964, 286).[39] Thus again we see that water could be considered better than beer in certain circumstances. In the mid-sixteenth century, Andrew Boorde could say that ale "must be fresshe and cleare, it must not be ropy or smokey, nor it must have no weft nor tayle," and he identified the beer of Cornwall as precisely a sort that was "dycke and smoky lyke, and also it is dyn ... wash, as pygges had wrastled dryn."[40] Furthermore, there clearly were various folk traditions about placing certain natural substances in beer to ensure that it was good to drink. Thus, Hildegard says that hot steel weakens any poison present in beer (*Phys.* 9.8 in *PL* 197.1351A) while it is suggested in an anonymous poem found in the late thirteenth-century Old Norse *Edda* (but certainly composed much earlier) that a leek in beer will protect the drinker from harm (*Sigrdrífumál* 37-38), and, in the late fifteenth-century Anglo-Norman *Peterborough Lapidary*, the ground "Diana" stone will give beer a good taste and make it harmless (66 in Evans and Serjeantson 1933, 85).[41] In the fifteenth century in Germany an eminently practical means of protecting beer in a drinking vessel from contamination was invented: the hinged lid (Kirsner and Gruhl 1984, 7-8, illustrations 182, 324).

In the end, no ancient or medieval source speaks explicitly of beer as a pure beverage, let alone one purer than water.[42] While it was believed that water could be improved by boiling, beer was not necessarily considered better than water because it was further fermented.[43] Indeed, in ancient and medieval theories of qualities, water and beer were considered very similar sorts of substances, and therefore to have some of the same effects on drinkers.

All substances, comestibles included, were thought to partake in the qualities of hotness or coldness and of wetness or dryness, as is already outlined in the Hippocratic corpus.[44] Galen, who adopted this system (*De temper.* 1.1; *Nat. facult.* 1.3), explained that substances can have different essential and incidental qualities (*De temper.* 3.3, 4); thus, for instance, while any given beverage might be hot to the touch (that is, incidentally hot), it might be essentially cold. In this scheme, water was considered essentially cold and wet; this is already found in the Hippocratic corpus and is repeated in a large number of ancient and medieval authorities.[45] Beer in this same sort of scheme is also considered usually cold and wet, though our earliest source for this is Galen.[46] This notion also certainly survived into the Middle Ages,[47] though some eventually came to consider beer hot and others dry.[48] On the other hand, wine was generally considered hot and dry,[49] though again there were exceptions.[50] On the whole, then, water and beer were traditionally considered by their essential natures to be similar substances and to be contrasted with wine, and indeed wine was often considered superior because of its inherent qualities.[51]

If both water and beer had identical inherent qualities (of coldness and wetness), what made beer potentially inferior, as has been seen, was its fermented (or decomposed) nature. On the other hand, what made beer potentially superior was not its unpolluted state but surely its taste[52] and, as explicitly outlined in many ancient and medieval sources, its ingredients, in particular cereal.This is made absolutely clear in the first century by Celsus, who says that of all drinks water is weakest (*imbecillissima*) and drink from grain is more nutritious (*firmior*) "since the grain itself is more nutritious" (*Med.* 2.18.11 [*quo firmius est ipsum frumentum*]).[53] Similarly, in the early sixth-century Anthimus notes that beer derives its goodness from the cereal used in it (*De obsv. cib.* 15). That this notion survived well into the Middle Ages seems clear from a number of sources. Thus Hildegard says, "Beer fattens the flesh of a man and provides a nice colour to his complexion because of the strong and good vigour [or juice] of cereal. Truly water weakens a man and sometimes induces a spot around his lungs, because water is weak and does not have a strong power. But if a man is healthy, if then he drinks water

occasionally, it will not work against him."[54] Anthimus uses the word *cervisa* and Hildegard *cervisia*,[55] and the notion that this was a strong beverage may have been reinforced by the popular, though certainly false, etymology for *cervisia*, first attested around the mid-fifteenth century but perhaps much older, that it is "the strength of Ceres [that is, cereal] in water" (*Cereris vis in aqua*).[56]

Later, in the sixteenth century, Thomas Elyot wrote (1544, 37a [2.21], followed by Cogan 1584, 221):

> If the corne be good, the water holsom and cleane, and the ale or biere well and perfytly brewed & clensed, and by the space of vi days or more, settled and defecate, it must nedes be a necessarye and convenient drynke, as well in syckenesse as in helth, consyderyng that barley corne, whereof it is made, is commended, and used in medicine, in al partes of the worlde, and accompted to be of a singular efficacy in reducyng the body into good temper, specially which is in a distemparature of heate.

Thus beer could be thought of as a necessary drink in so far as the cereals in it were believed to make it a healthful and nutritious beverage.

Beer is at present considered a purer beverage than water since for its making water is boiled and there is a further fermentation (and often also pasteurization). Modern beers are also protected against spoilage through the use of hops.[57] Certainly from early times various herbs have been added to beer as preservative agents until hops came to be regarded as the most useful (Corran 1975, 35; DeLyser and Kasper 1994, 167; Nelson 2005a, 109–10). Hopped beer even came to be viewed as a necessity, such as among some ninth-century French monks (Anseg., *Const. abb. Fontan.* 66 in *MGH-S* II, 300.23, referring to "as much as necessity requires" [*quantum necessitas exposcit*] of hopped beer [*sicera humolone*]). However, though hops were already used in beer by the ninth century (if not much earlier), it took many centuries for its benefits to be generally acknowledged and for a taste for the beverage to be widely developed (Nelson 2005a, 107–08).[58] Hildegard for one noted that the hops plant prevents spoilage in drinks but otherwise considered it an unhealthful additive which causes melancholy, weighs down the innards, and makes one practically insane (*Phys.* 1.61 in *PL* 197.1153C).[59] Although this may well be a rather idiosyncratic opinion, it still exemplifies how even a drink which was perfectly pure (such as boiled water or hopped beer) could still be considered quite unhealthful.

Though others after Hildegard, such as Andrew Boorde, considered unhopped ale healthier than hopped beer (1542, ch. X, s.vv. ale and beer),[60] by the end of the sixteenth century it came to be thought instead that hops made beer a "wholesome drinke."[61] Thomas Tusser wrote the following verses (1573, 52):

> The hop for his profit, I thus do exalt,
> it strengtheneth drink, and it favoreth malt.
> And being wel brewed, long kept it will last:
> and drawing abide, if ye drawe not to fast.

Similarly, in John Gerard's herbal of 1597 it is said (738):[62]

> The manifold vertues of hops do manifestly argue the holsomnesse of beere above ale; for the hops rather make it a phisicall drinke to keepe the body in health, then an ordinarie drinke for the quenching of thirst.

Again, beer is not the ordinary drink which quenches thirst; it is presumably water which fulfils this function. In an anonymous pamphlet printed in 1647 the author promotes as a beverage (3)

> good strong beere as shall be most cherishing to poore labouring people, without which they cannot well subsist, their food being for the most part of such things as afford little or bad nourishment, nay sometimes dangerous, and would infect them with many sicknesses and diseases were they not preferred (as with an antidote) with good beere, whose vertues and effectuall operations by helpe of the hop well boyled in it, are more powerfull to expell poisonous infections then is yet publickly known or taken notice of.

Here beer is better than other comestibles which cause infections and disease (perhaps including water, though it is not explicitly mentioned), not simply because it is boiled but because of its hops, and the author suggests that because of beer's healthfulness it must be made available to poor laborers in licensed alehouses. It is in this way that beer could start to be seen by more and more people as a necessity.[63]

Conclusion

The typical arguments for beer being a standard beverage and water being neglected in the Middle Ages (or in general in pre-modern times) are not cogent. Water was to be avoided if it was of inferior quality or not properly boiled while beer was to be avoided because it was a fermented beverage or when it was allowed to spoil. Authorities debated about the healthfulness of beer with respect to its qualities of cold and wet, but not in regards to its relative purity. Beer was sought after because it was made from cereals, which made it more nutritious than water, and later because of its hops, which preserved it against infection. Richard Short further argued that beer is better than water because, among other things, it agrees better with the English constitution, quenches thirst better, represses vapors which travel from the stomach to the brain, and is a better diuretic (1656, 61–64).

Just as there was a hierarchy of waters there was also a hierarchy of beverages in general, one that can be traced back to antiquity and which was perpetuated throughout the Middle Ages. This hierarchy of beverages was popularized through the gradual hegemony of the wine-drinking Romans, replacing the tradition of indiscriminate imbibing among northern European peoples (Nelson 2005a, 38–44), a change first attested among the Gauls in the first century BCE, who came

to value, in order from least good to best, plain beer, honey beer, and wine (Nelson 2005a, 50, citing Posid., fr. 170 Theiler in Athen., *Deipn.* 4.152c [cited in Eust., *Comm. ad Hom. Il.* 11.638]).[64] Unlike the hierarchy of waters, this hierarchy was certainly based less on considerations of healthfulness than on ready availability and affordability of drinks and hence on cost and status, and this hierarchy remained remarkably unchanged over a long period of time in various places, both in northern and southern Europe.[65] Water was considered the most basic beverage, then came beer, and then wine (made from various fruits, but grape wine was considered foremost). When wine was not available (or could not be afforded), one drank beer; when that was not available (or could not be afforded), one drank water. The most direct proof for this in the Middle Ages comes from a letter written by Lupus, Abbot of Ferrières, in 843 (*Epist.* 30 in Levillain 1964, 138 and140):

> We want Folchricus and Maurus to return with the aforementioned brother, so that they may enjoy with us the perry, of which they are particularly fond (for this year a scarcity of wine is feared). However, so that we should declare the truth, a shortage of fruits threatens this [perry], [and] truly a barren production of cereal [threatens] beer. Therefore we will all use a safe, natural drink, by means of which the health of the soul and body is often acquired, not drawn from a muddy cistern but from a clear well or the current of a glassy river.[66]

Here Lupus explains that, because of a scarcity of wine, perry may be available at his monastery for certain guests who like it, though he admits a shortage of fruits (that is, pears) may mean that the perry will be unavailable and a lack of cereal may also mean that beer will be unavailable, leaving only one drink, one so obvious that Lupus does not need to mention it by name: water. Water is surely not spoken of as a last resort because it is considered unhealthy; quite to the contrary, Lupus praises its healthfulness (as well emphasized by Squatriti 1998, 36, n. 82). And, he distinguishes between bad water (from a muddy cistern) and good water (either from a clear well, or a transparent river).

Furthermore, in the following century the Englishman Aelfric Bata could write in a schoolbook of wine as the drink for the rich, ale for the poor, and water for the poorest (*Colloq.* 298-302).[67] Again the idea is clear: beer and wine are used as luxuries not as necessities. Some other early medieval sources are less explicit but still seem to follow the idea of a hierarchy of beverages. Thus, in the late seventh century Theodore of Tarsus speaks of wine, mead, honey beer, beer, and water, seemingly valuing them in that order from best to least good (*Lib. poenit.* 1 in *PL* 99.935D). An anonymous old Irish travel tale from around the ninth century mentions wine, beer, whey, milk, and water (*Immram curaig Maile Dúin* 20 in Stokes 1889, 50), which "probably represents the true gradation" of beverages (Ryan 1972, 389). In the Welsh laws under the tenth-century King Howel the Good, the order seems to be the following: mead, honey beer, and beer (Owen 1841, 757, 784, 821, 828, 873, 882).

The widespread existence of this hierarchy is further confirmed in the mid-thirteenth-century Middle High German poem *Meier Helmbrecht* by Wernher der Gartenaere (for brief discussions of food and drink in the poem, Jones 1960, 84; Bell 1965 [1931], 149-51). When Helmbrecht, the son of a poor farmer also named Helmbrecht, wishes to become a knight the contrast is made between water-drinking in his home and wine-drinking at court (443-44 and 471-72). After Helmbrecht becomes a knight and returns home, he must suffer for a week without wine (1118-19), the drink he has been used to drinking in great quantities at court (986-1006). His father acknowledges that he has no wine and mead like the rich do (793-794) and that instead they drink spring-water, but spring-water which, as he emphasizes, is from the best available source (891-98). Beer is specifically the drink of a rich peasant, not so poor as the Helmbrechts nor so rich as the knights (1166), and it is also the drink which Helmbrecht's sister Gotelint hopes to have once she has married the knight Lämmerstint (1401). In fact, even better, she is provided with wine (1541) in large quantities (1555) at her wedding feast.

In conclusion, water was freely and readily available, its purity was tested, it was boiled, and it was drunk when nothing else was available or could be afforded. Beer (among other beverages) was preferred not because of its supposed higher level of purity but because of certain inherent deficits in water (its weakness) or strengths in beer (its nutritious cereal basis and/or use of hops) and because it was more costly and acted as a status symbol. Of course, beer was probably also often more tasty than water (particularly boiled water) and provided, for those seeking it, the possibility of intoxication though its fermented nature could be considered both physically and morally hazardous.

Notes

1. The author would like sincerely to thank Paolo Squatriti, Stephen C. Law, Barbara Bowers, and the anonymous readers for their helpful suggestions. Abbreviations of collections are as follows: *AS* = *Acta Sanctorum* (1643-1940); *FGrH* = *Fragmente der griechischen Historiker* (1923-); *MGH-S* = *Monumentum Germaniae Historica — Scriptores* (1826-1913); *MGH-SRM* = *Monumentum Germaniae Historica — Scriptorum Rerum Merovingicarum* (1885-1920); *PG* = *Patrologia Graeca* (1857-1868); and *PL* = *Patrologia Latina* (1844-1855).

2. Squatriti does not pursue his insights with respect to the use of beer. Similarly, Martin notes (2009, 42): "The quality of water in traditional Europe was not yet as bad as it would later become as a result of urbanization and industrialization, but those who could afford alcoholic beverages preferred to drink them rather than water"; he further provides examples at 46 and 62. Compare also Magnusson (2001, 134): "The provision of water for drinking and domestic use was a primary function of most medieval fountains. Medieval attitudes toward water as a beverage were not entirely negative, but in general other drinks (especially ale, beer, or wine mixed with water) were preferred"; however, she

elsewhere explains the use of alcohol as due to water pollution (2006, 302). Holt (2000, 97–98) and Adamson (2004, 48) accept both the general impurity of medieval water and the cultural prejudice against it and in favour of beer and wine.

3. Rufus also mentioned date beer (fr. 197.1 in Rhazes, *Cont.* 11.1), an important reference missed in Nelson 2005a. Plin., *Hist. nat.* 31.21.31–23.40 attested to the great variety of existing opinions in his day. Isid., *Etym.* 20.3.1 said only that water is useful when taken fresh from a river, spring, or well.

4. Avic., *Can.* 10.8.1–2 (848–870): rain-water, snow-water / ice-water, well-water, any stagnant water; Hild., *Caus. et cur.* 1 (in Kaiser 1903, 28–30 and Moulinier 2003, 52–54): well-water, spring-water, river-water / rain-water, snow-water (for the dangers of swamp-water, see Kaiser 1903, 27 and Moulinier 2003, 51–52); Barth., *Prop.* 13.1: rain-water, well-water, river-water, lake-water, and snow-water; and Petr., *Rur. comm.* 1.3.2–10: spring-water, running-water, rain-water, well-water, marsh-water, standing-water, snow-water, and ice-water. Thomas of Cantimpré (*De rer. nat.* 19.4) and Aldebrandino of Sienna (in Landouzy and Pépin 1911, 18) also praise rain-water as best. See also, for instance, among later authors, Elyot 1544, 34b (= 2.18) (rain-water, spring-water, and river-water) and Tryon 1696, 7–23 (rain-water, river-water, spring-/fountain-water, pump-/well-water, pond-/standing-water).

5. Compare Gal., *Comm. Hipp. Aer.* 8, cited in Orib., *Coll. med.* 5.1.7, who says that "everything boiled is rendered more potable" (*panta hepsomena glukutera ... apoteleitai*). For an example of an ancient discussion of potable versus non-potable water, see Athen., *Deipn.* 2.46b-e. For other means of testing and purifying water known to the ancients, see Vitr., 8.4.1–2 and 8.6.15 and Plin., *Hist. nat.* 31.23.38, with Forbes 1964, 177–178.

6. Hdt., 1.188, cited at Athen., *Deipn.* 2.45a-b, and Ctes., *FGrH* 688F37 in Athen., *Deipn.* 2.45b.

7. Plin., *Hist. nat.* 31.23.40 and Suet., *Nero* 48.3. The drink is also mentioned in Juvenal (5.50), and (as *dēkokta*) in Galen (*De meth. med.* 7.4) and Athenaeus (*Deipn.* 3.121e and 122e), and (as *cocta*) in Martial (2.85). See further Gowers 1994. For cold drinks as a luxury, see de Planhol 1995.

8. Vitruvius (8.4.1) already mentioned boiling water in a bronze cauldron to test its purity. Interestingly, under the Emperor Ampelius (371–72) it was forbidden for any commoner to heat (*calefaceret*) water before a certain hour of the day (Amm. Marc., 28.4.4). Dalby (2003, 346) believes that water was often boiled in ancient times before being drunk alone or in a mixture with wine. Similarly, White (1984, 168) believes that Pliny's evidence (cited above) "suggests that boiling was a common way of making it safe for drinking".

9. Thus, among others, Newman is incorrect in saying (2001, 17): "Beer was a far more hygienic beverage than water during the Middle Ages because of the lack of technology for purifying drinking water". McKeown (1983, 232) even states that boiling water to purify it was unknown as late as the nineteenth century.

10. That rain-water is good because it is heated by the sun is also to be found earlier, for instance, in Gal., *Comm. Hipp. Aer.* 8, cited in Orib., *Coll. med.* 5.1.7, and later, for instance, in Honor. Aug., *De imag. mund.* 1.59 in *PL* 172.137B.

11. For Hildegard on boiling water, see further Thorndike 1923, 133–134.

12. Petr., *Rur. comm.* 1.3.5: "in fact sublimation and distillation, and similarly boiling, fix bad waters" (*sublimatio quidem et distillatio aquas rectificant malas, et similiter decoctio*); 6: "if rain-water is boiled its intake of putrefaction is diminished" (*quodsi aqua pluvia ebullierit, eius putrefactionis receptio minuetur*); 10: "when it is boiled it returns to a good state" (*cum coquitur, ad bonitatem redit*); and 13: "water, however, is made better if it is vigorously boiled ... and it is even wholly better when there is distillation by sublimation" (*emendatur autem aqua, si vehementer coletur ... et maius hoc toto est ipsum sublimando distillare*). Aristotle already understood from his own experimentation that distillation (boiling to the point of evaporation and then the subsequent condensation back into a liquid state) desalinates salt water (Arist., *Meteor.* 2.3 [358b16–17], with Alex. Aphrod., *In Arist. Meteor.* 86.20–24 Hayduck), and the same knowledge seems to be hinted at in those accounts in which it is said that boiling (*i.e.*, distilling?) seawater could rid it of its salt and make it potable (Ps.-Arist., *Probl.* 23.18 [933b11–16], Plut., *Quaest. nat.* 5 in *Mor.* 913c, Florent. in *Geopon.* 2.47.3, and Cass. Fel., *Probl.* 64). For other possible ancient and medieval evidence of distilling, see Wilson 2006, 17–165.

13. For instance, William Bulleyn in the sixteenth century wrote (1558, 103a): "Also waters that is put in wine, etc. ought first to be sodden or it be occupied cold, and so the fire dothe clense it from corruption." Also, in the seventeenth century, William Vaughan wrote (1633, 14): "if at any time you be compelled to drinke it, see first that you seethe your water gently for by seething, the grosse substance of it is taken away"; and John Archer wrote (1673, 61): "Waters are corrected by boyling."

14. Already in the fourth century BCE, Aristagoras (*FGrH* 608F7 in Plut., *De Isid.* 5 in *Mor.* 352F) believed that salt was impure because of "many small creatures" (*polla tōn mikrōn zōōn*). In the first century BCE, Varro (*Rer. rust.* 1.12.2) wrote: "one must be careful also if there are swampy places ... because certain small creatures grow which cannot be observed by the eye and they come through the air into the body through the mouth and nose and cause serious illnesses" (*advertendum etiam, siqua erunt loca palustria ... quod crescunt animalia quaedam minuta, quae non possunt oculi consequi, et per aera intus in corpus per os ac nares perveniunt atque efficiunt difficilis morbos*); he further said (1.12.3) that such "little beasts" (*bestiolae*) can die from the dryness of the sun. The World Health Organization (2011, 143) notes that microbial ("little creature") pollution in water can indeed be corrected by exposure to sunlight (and for the types of microbes which contaminate water, most often through human or animal feces, see 231–306). For the ancient tradition of animalcula, see Nutton 1983, 11, who further discusses various other pre-modern theories of contagion and infection.

15. See, for instance, Glasgow 2009, 271. Beer need not be made by brewing (that is, boiling water). Ancient Mesopotamian and Egyptian beers may have been usually made instead by fermenting crumbled loaves of malted cereal in water; on the other hand, brewing may have been a peculiarly European innovation (reflected in the Greek word *brūtos* ["the brewed"] for beer) (see Nelson 2005a, 21–24, though Oort 2002 provides potential, independent evidence of brewing as well as distilling in ancient India). That beer was brewed in Europe is already explicitly attested in the fourth century BCE in Theophrastus (*Hist. plant.* 4.8.12). No other mentions to brewing come before the late fourth century: Paulus Orosius (*Hist. adv. pag.* 5.7.13) says that *caelia* is the juice of wheat (*sucus tritici*) which has been so named from being "heated" (*calefaciendo*); though he subsequently goes

on to speak of the processes of malting and milling the cereal and of fermentation (5.7.14) he leaves out boiling (Orosius is repeated verbatim in Isid., *Etym.* 20.3.18 and Paul Diac., *Hist. misc.* 4.17). However, Gregory of Tours (*De glor. confess.* 1), writing only shortly thereafter, logically says that Orosius is referring to a *coctio* which is "boiled" (*coquendo*), and Gregory himself speaks of beer made "from cereals soaked and boiled in water" (*ex annonis aqua infusis atque decoctis*), as does also Jonas Krusch (*Vit. Columb.* 16) when he says that beer "is boiled from the juice of wheat or barley" (*ex frumenti vel hordei succo excoquitur*), while Altrifidus (*Vit. Sanct. Liudg.* 2.8) says that "the composition of beer was boiled" (*cervisae ... confectio cocta*). For the earliest references to brewing (in the strict sense of boiling to make beer), see Nelson 2001, 126–129. For double-brewed beer see Nelson 2005a, 88; for beer being made from double-boiled water, see Nelson 2005a, 111. For the chemical reasons for boiling wort in making beer, including the need for sterilization, see Hughes and Baxter 2001, 7–8 (and see 128–129 for the modern standard for the water used in brewing).

16. McBride 2004, 182 is alone in attributing the popularity of beer over water as due rather to filtration (on which, see below): "In a society without reliable access to safe, clean water (which was becoming increasingly polluted as the urban population increased), ale offered the health advantages of filtration".

17. For this point, see Nelson 2005a, 91. Note for instance that while Pliny knew that boiling water could purify it (*Hist. nat.* 31.23.40 [cited above]) he spoke negatively about beer (22.82.164), which he considered intoxicating water (14.29.149). Hutkins 2006, 3 notes that fermentation does not always make a product safer to drink than the raw material from which it was made.

18. Dionys. Hal., *Ant. rom.* 13.11.1, Tac., *Germ.* 23.1, and Gal., *De simpl. med.* 6.6.3 (who is copied by Orib., *Collect. med.* 15.1.6.6, Aët. Amid., *Lib. med.* 1.154, and Paul Aeg., *Epit. med.* 7.3.6). It seems that in general fermentation was considered putrefaction; note that yeast (*zumē*) was said to have "putrefactive heat" (*sēpedonōdous thermotētos*) in Gal., *De simpl. med.* 6.6.4 (cited in Orib., *Collect. med.* 15.1.6.8 and *Lib. ad Eun.* 2.1.6, Aët. Amid., *Lib. med.* 1.155, and Paul Aeg., *Epit. med.* 7.3.6).

19. Scully 1995, 138 is therefore wrong in asserting: "Alcoholic beverages ... were universally recognized as readily digestible — and even beneficial to the digestion — nutritious, and pure". Beer is also said to be harmful to the stomach in one ancient medical source (Ps.-Gal., *De affect. ren. insid. dign. et curat.* 7). For a standard misinterpretation of Africanus's discussion on beer, see Nelson 2005b, 131–132.

20. For the context of these early Christian texts, see Nelson 2005a, 74–76.

21. For instance, Glover 1997, 16 claims that clear, light-coloured beer, appreciated in transparent glassware, was a nineteenth-century innovation. In a number of thirteenth-century medical recipes "cleared" (*defecata*) beer is specifically called for (see the texts in Hunt 1990, 225, 227, 236, 241, 246, 249, 251 [twice], 253, 262, and 263 [twice]). In the *Liber albus* of 1419 there is mention of "cleire cervoise" at 3.2 (in Riley 1859, 316) and "bone et clere cervoise" at 3.3 (in Riley 1859, 359). Among later sources, Vaughan (1633, 21) says that good ale should be "cleare of colour" while an anonymous author (1647, 2) speaks of good beer as amber, clear, and sparkling; further sources are cited below. Already in the first century glass was appreciated for not imparting its own smell to the drink contained within (see Petr., *Sat.* 50), thus long before the time implied in Alexandre-Bidon 2005, 161, and the fourth-century alchemist Zosimus recommended using glass containers because pottery ones are absorptive (3.21.3 in Berthelot and Ruelle 1888, 2.175–176). See also Evison 1975 for ancient Germanic glass drinking horns perhaps used for beer.

22. Wine spoiled: Emped., fr. 81 Inwood in Plut., *Quaest. nat.* 2 in *Mor.* 912c (and see 31 in *Mor.* 919c-d) ("wine is water from the skin [of grapes] rotted in wood" [*oinos apo phloiou peletai sapen en xulō hudōr*]). Wine non-watery: Arist., *Top.* 4.5 (127a17–19), explicitly responding to Empedocles. See further Nelson 2005a, 36 and 133, n. 25 for ancient references to rotten wine as well as for the link between yeast and spoilage.

23. Greeks: The earliest reference seems to be Hom., *Il.* 9.203; see Nelson 2005a, 124, n. 22. Romans: Dunbabin 1993, who shows, however (esp. 128–129), that while the Greeks usually practiced the mixing of wine and water in a communal container for all drinkers at a party the Romans tended rather to mix in separate cups to individual tastes with either cold or hot water. Middle Ages: Wilson 2003, 152–157 (on the mixture of wine and water at communion) and 166 (positing the gradual obsolescence of the tradition).

24. See in general Villard 1988, who points out (28) that it may have had something to do with combining the cold quality of water with the hot quality of wine (for more on which, see below).

25. Plut., *Quom. adol. poet. aud. deb.* 1 in *Mor.* 15e (*aphairei gar hē krasis tou oinou to blapton, ou sunanairousa to chrēsimon*). Diodorus Siculus (4.3.4) had already written that unmixed wine causes madness but when it is mixed with rain it delights without causing problems. There are numerous ancient sources on the dangers of drinking wine straight; note, for instance, Mnesitheus's claim that it is injurious to body and mind (fr. 45 Bertier in Athen., *Deipn.* 11.484a) and the tradition that the Gaul Brennus killed himself by drinking unmixed wine (Paus., 10.23.8).

26. A list of ancient water-drinkers is provided in Athen., *Deipn.* 2.44b-f. For the disputes between ancient "water-drinkers" (*hudropotai*) and "wine-drinkers" (*oinopotai*) over which beverage provided greater literary inspiration, see North 1948, 12–16 and in general Beer 2010, 89–91. For medieval debates of water versus wine, see Wilson 2003, 162–165.

27. Wine (*vinum*) was even linked by some to *venenum* ("poison") (Isid., *Etym.* 20.3.2), paralleling modern English usage ("What's your poison?").

28. Ruf., fr. 411.10 in Rhazes, *Cont.* 37.1, as well as Orib., *Syn.* 4.41.12 and Paul Aeg., *Epit. med.* 1.50, who are probably simply indebted to Rufus. Note also that the second-century novelist Achilles Tatius (*Leuc.* 4.18) wrote that Egyptians did not fear to drink Nile water straight without mixing in wine, thus implying that wine was usually used to purify water.

29. It has been suggested that the Spartan practice of bathing newborn children in wine (cited in Plut., *Vit. Lyc.* 16) "was prompted by primitive hygienic motives, the wine acting as a mild antiseptic" (Michell 1964, 166). While it is true that wine was used in Greco-Roman medicine when dressing wounds (see Majno 1975, 150, 154, 161, and 367 [from Hippocrates] and 399–400 [from Galen], with 186–188 [on the antiseptic property of wine not being due to its alcohol content, which is rather low, but to polyphenols]), the rationale behind this is never linked to the issue of disinfection, and water was also just as readily used on wounds (see Hipp., *De humid. usu* 1–3 [water], 4 [vinegar], and 5–6 [wine]).

Wigelsworth states, citing no source (2006, 17): "Medieval scholars also suggested also (sic) that wine served as a satisfactory antiseptic."

30. An interesting exception is a poem (96) by the thirteenth-century Henry of Avranches in which beer is compared to marsh-water (see Russell and Heironimus 1935, 15).

31. For rain-water being boiled down to a quarter to make mead, see Colum., 12.12.3.

32. In another twelfth-century source (an anonymous Irish poem) a wild man says that better than beer drunk ceremoniously at a monastery is fresh water from a spring (*Buile Suibhne* 2309–2312 in O'Keeffe 1952, 81). Many more such sources could be cited. For the anxiety concerning drinking beer in monasteries, see Nelson 2007.

33. Similarly, grapes are not to be pressed by foot so that everything is "clear and decent" (48 [*nitida et honesta*]). For the potential problems of foreign yeast and bacteria spoilage during beer production, see Esslinger 2009, 480–484.

34. For the vulnerability of beer to bacteriological spoilage, for which pasteurization is now widely used as a safeguard, see Hughes and Baxter 2001, 131–132. For its invulnerability to toxins, see above.

35. This work may come from twelfth-century England (Glorieux 1952, 53). In an anonymous Old Irish penitential it is said that anyone who drinks a beverage in which there is a dead mouse must do seven days' penance (1.4 in Gwynn 1914, 146) while anyone who serves such a beverage must fast three times (1.12 in Gwynn 1914, 148).

36. For such "ale-conners", see the solid account of Bennett 1996, esp. 100–103 and 159.

37. See the responsibilities of ale-conners provided in the 1419 *Liber albus* 2.2 (in Riley 1859, 316).

38. See Nelson 2005a, 115, and see above for ancient sources which describe beer as cloudy and see below for ancient sources which describe beer as sour. Certain herbal additives (such as hops, on which, see below) could make the beer bitter whereas extra, unfermented sugar (such as from honey) could make the beer sweeter (as well as keep longer).

39. Purportedly the seventh-century Saint Sadalberga miraculously prevented beer from spoiling "into the sourness of vinegar" (Jonas (?), *Vit. Sadalb.* 20 in *MGH-SRM* V, 61.17 [*in acerbitatem aceti*]).

40. Boorde 1542, ch. X, *s.v.* 'ale' and 1562, n.p. (and then again on the following page: "whyte & thycke, as pygges had wrastled in it, smoky and ropye"). Karkeek 1877 showed that such beer was still being made in Devon in the nineteenth century, the recipe for which often called for eggs as an additive. For further references to beer which was considered to have a poor appearance, see Salzman 1964, 291 and 293.

41. Other additives in beer (such as the pepper, peony, garlic, and fennel seed mentioned in William Langland's *Piers Plowman*, Passus V, 304–305) may have rather been used simply to improve the flavour (just as some today use a lemon, lime, or orange slice or even salt).

42. St. Brigid is said to have miraculously turned bathwater into beer (Anon., *Vit. Sanct. Brigid.* 16.100 in *AS* 4.133C and the later sources cited by Nelson 2005a, 154, n. 29, to which can be added Vinc. Bell., *Spec. hist.* 22.30 Douai edition), which may imply that beer was conceived as usually being a form of purified water, but most likely the story simply emphasizes the stupendous nature of the transformation. In fact, authorities commonly call on beer to be made with water that is already of good quality, beginning with the late antique recipe for beer in which "fresh water" (*hudōr gluku*) is specifically called for (Ps.-Zosim. in Berthelot and Ruelle 1888, 2.372).

43. Note, for instance, the anonymous author (1630) who claimed that water "is found to bee as wholesome and healthfull as beere".

44. See, for instance, Hipp., *De nat. hum.* 2–3 (all things partake in the four qualities) and *De prisc. med.* 13–15 (how the four qualities in various foods and drinks, along with other properties, can affect people).

45. Hipp., *De diaet.* 1.4, 1.27, and 2.52, and *De carn.* 2, and see, for instance, Gal., *De simpl. med.* 1.8 as well as *De temper.* 1.6 (water is wet) and 3.3 (water is cold), Macr., *Sat.* 7.5.21, Anon., *De alim.* 25 (water is cold) and 27 (water is wet) in Ideler 1842, 268 and 269, Honor. Aug., *De imag. mund.* 1.3 in *PL* 172.121C, Hild., *Phys.* 2.2 in *PL* 197.1211B, Barth., *Prop.* 13.1 (quoting Constantine the African), Vinc. Bell., *Spec. hist.* 2.16 Douai edition, Thom. Cant., *De rer. nat.* 19.4 (citing the lost encyclopedist known as the "experimentator"), Aldebr. in Landouzy and Pépin 1911, 117, and Petr., *Rur. comm.* 1.3.1. Among later authors, see also, for instance, Anonymous 1539, ch. 54, Vaughan 1633, 13, Short 1656, 66, and Archer 1673, 59. Also cold and wet were women (Hippocr., *De diaet.* 1.27 and 34 and Macr., *Sat.* 7.6.17 and 7.7.1–12) and old people (Hippocr., *De diaet.* 1.33).

46. Gal., *De simpl. med.* 6.6.3, cited in Orib., *Collect. med.* 14.10.10 and 15.1.6.6 (*psuchron, hudatōdes, oxu* ["cold, watery, sour"]). Paul of Aegina (*Epit. med.* 7.3.6) said that beer is cold because of its sourness. That beer is usually cold is also found in Cyril, *Comm. Is.* 2.4.287–288 in *PG* 70.459CD and Anth., *De obsv. cib.* 15. Barley too was considered by nature cold and wet (Hipp., *De diaet.* 2.40); for barley being cold see also Anon., *De alim.* 25 (in Ideler 1842, 268) and, much later, Cogan 1584, 222 and W. 1641, 89; for barley being by nature cold and dry, see Cogan 1584, 27 (with 28, where beer itself is said to be hot); and for it being good against excessive heat in the body, see Elyot 1544, 37a (= 2.21). However, in an anonymous herbal barley is said to be hot and dry (1539, ch. 319).

47. Bulleyn (1558, 111b) says that beer is good for cholerics and bad for phlegmatics (and note Cokain 1658, 135: "Ale and Beer breed Flegm"), that is that it is cold and wet, since if one is excessively hot and dry (that is choleric) one must seek out the cold and wet (connected to the phlegmatic); this principle of medical antitheses (allopathy) is described, for instance, in Hipp., *De prisc. med.* 13, Cels., *Med.* 1.3.14, and Gal., *De temper.* 3.5, and later by Roger Bacon (in Little and Withington 1928, 112, cited in Getz 1998, 61) among others.

48. Hot: Cogan 1584, 28. Dry: Elyot 1544, 37b (= 2.21), who says that beer lacks heat and moisture. Short 1656, 67 explains that small (that is, low-alcohol) beer is cold and wet but that strong beer is hot.

49. Hipp., *De diaet.* 2.52 and Archer 1673, 62 (who also says that wine mixed with water is also hot and dry). This is like men (Hipp., *De diaet.* 1.27 and 34) and youths (1.33).

50. For antiquity, see Nelson 2005a, 33–34. Strangely, in Anon., *De alim.* 24–25 (in Ideler 1842, 268) old and sweet wine is considered hot while new and sour wine is considered cold. According to Elyot, wine is hot and moist (1544, 35a-b [= 2.19]), like man's

body, and thus is good (37b [= 2.21]).

51. For the genesis of this view in antiquity, see Nelson 2005a, esp. 33–34, followed by Esslinger 2009, 7–8. Many examples of wine being considered superior to beer could be cited from ancient and medieval literature; a very explicit comparison is in Egin., *Hist. Marcell. et Petr.* 4.45 in *PL* 104.564C in which by a miracle beer is transformed into wine, "from a worse beverage into a better one" (*deterioris potionis in meliorem*). Bulleyn (1558, 112b) says that overall wine is better than beer.

52. Hughes and Baxter (2001, 99) say that beer "has long been recognized as a palatable way of providing this essential fluid [that is, water]", while Pounds (2005, 64) states that "the process of fermentation ... rendered a drink more palatable", and Forgeng and McLean (2009, 191) write that water is "less flavorful" than alcohol. This would especially be the case with boiled water; thus Accum (1820, 51) notes "the insipid and vapid taste of newly boiled water", and, for instance, White (1984, 168) says that boiled water is "notably insipid".

53. Not all agreed; thus Athenaeus (*Deipn.* 2.46e) said that water is as nourishing as milk and wine. Austin *et al.* 1985, xvi point out that wine and beer "provided important nutritional supplements". For the use of beer in ancient medicine, see Nelson 2005a, 71–74.

54. Hild., *Caus. et cur.* 2 (in Kaiser 1903, 150 and Moulinier 2003, 190) (*cervisia* [cod.; *cerevisia* Kaiser] *autem carnes hominis incrassat et pulchrum colorem faciei eius praestat propter fortitudinem et bonum succum frumenti. aqua vero hominem debilitat et livorem circa pulmonem eius, si infirmus est, aliquando parat, quoniam aqua debilis est et fortem virtutem non habet. sed si homo sanus est, si tunc interdum aquam bibit, ei non oberit*). Compare Kaiser 1903, 114 and 118 and Moulinier 2003, 155 and 158.

55. Hildegard's own made-up word for beer was *briczinz* (*Ling. ign.* 691).

56. Geoffr., *Prompt. parv. s.v.* 'ale' in Mayhew 1908, 8–9. No doubt this etymology is an elaboration of the (equally false) one found in Isid., *Etym.* 20.3.17: "*cervisia* was named from Ceres, that is cereal" (*cervisia a Cerere, id est fruge, vocata*). For this as a Celtic loan word in Latin, see Nelson 2001, 54–55.

57. Hops in beer make it "resistant to bacterial spoilage" (Hughes and Baxter 2001, 112) and "increase the biological shelf-life with their antibacterial properties" and "increase the microbiological stability of beer" (Esslinger 2009, 87 and 99).

58. Hops were already used in England in beer by the tenth century, as is clear from Anon., *Herb.* 68.1 (in De Vriend 1984, 110) and from archaeological evidence (see Nelson 2005a, 112). Apparently its use lapsed in England only to be revived again a few centuries later.

59. Hildegard considered hops to be hot and dry; some agreed (Gerard 1597, 738) while others said at least that they were hot (Buttes 1599, *s.v.* 'Hoppe' [hot and wet] and W. 1641, 89), and some thought rather that they were cold (see Elyot 1544, 37a [= 2.21]).

60. Boorde's distinction between unhopped ale and hopped beer is already found around 1440, when Geoffrey the Grammarian (*Prompt. parv. s.v.* 'beere' [in Mayhew 1908, 30]) defined "beere" as *hummulupotus aut cervisia hummuluna* ("a drink of hops or a hopped cereal-based beverage"); he also noted (in Mayhew 1908, 225) that "hopp" is "seyd ffor beyr". Compare Peter Levins's definition (*Manip. vocab.* 84) of "bere" as *potus lupinatus* ("a hopped drink"). This distinction remained popular until the eighteenth century, though by then ale was simply more lightly hopped than beer (see, for instance, Short 1727, 27). However, in modern usage (as adopted throughout this paper) ale is rather a type of beer (a generic term for all malt-based, non-distilled intoxicants), which is distinguished from lager principally by the type of yeast used to make it.

61. See, for instance, Plat 1596, n.p. Cogan (1584, 221) spoke of the "medicinable propertie of the hoppes" in beer. Scot (1574, 47) had suggested that dried hops provide more "vertue" than green hops, but whereas he suggested that hops should be dried in an oven (38–47), Tryon (1691, 30–31) thought that sun-dried hops were best. Tryon, however, was peculiar in believing that water (19) and beer (10–36) were best when no boiling occurred.

62. Although in this passage he clearly distinguishes beer and ale, a little earlier on the same page Gerard says that hops "are used to season beere or ale with". A similar account of the virtues of hopped beer is given in Parkinson 1640, 177.

63. Wrightson, who cites the pamphlet (1981, 2) and discusses the issues of poor labourers and licensing alehouses (2–5), quotes a licence in Langham from 1601 which speaks of beer as a necessity (23, n. 5): "the poor folks thereabouts inhabiting are greatly hindered in their work in going far for their bread and beer and other necessaries". Short 1656, 66 also praises hops, saying that they "hurt not in quality but in quantity", and he believes beer to be "wholsomer than ale".

64. For beer being considered a substitute for wine, see the sources collected in Nelson 2003, 112, n. 54.

65. For a different approach, which rather emphasizes north/south differences, see Engs 1995.

66. *Folchricum et Maurum cupimus cum fratre memorato redire, ut piracio, quo unice delectantur (nam hoc anno penuria vini timetur), nobiscum fruantur. Raritas tamen fructuum id ipsum defuturum, ut prodamus veritatem, minatur, cervesiam vero sterilis annonae proventus. Tuto igitur naturali potu, quo salubritas animae corporisque nonnumquam adquiritur, omnes utemur, non hausta lutulenta cisterna, sed puteali perspicuitate aut vitrei rivi decursu.* Lupus also speaks of the use of beer instead of wine at *Epist.* 54 (in Levillain 1964, 219). Note the similar idea much later in Plat (1596, n.p.) when he advises that seamen keep on hand "faire water" in case "their wine, cider, perry, and beer are spent".

67. The latter is quoted by Bennett (1996, 17), who concedes that "[o]f course, the very poor sometimes could not afford ale" and drank water instead (impurities and all?). Similarly, Pounds (1994, 201) says: "Water was, of course, drunk, but much of the supply was contaminated, and it was avoided by all who could afford to do so" and Unger (2004, 3) calls beer "a standard drink for all who could afford it". Furthermore, Forgeng and McLean (2009, 191), believing that water was often polluted, still say that it was the drink of the poor while ale was the general staple and wine was used only by the wealthy. On the other hand, Dyer (1989, 159) convincingly shows that "strong ale" was drunk as a luxury "instead of small ale, cider, milk, and water" following the same consumer trend that had the better-off using wheat rather than barley or rye and using fresh rather than cured meat and fish.

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